

# Using Dicamba in Dicamba-Tolerant Crops<sup>1</sup>

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After many years in development, dicamba has been fully approved for use in the XtendFlex cotton varieties since the 2017 growing season. With the wider use of dicamba and numerous injury cases related to it, there is huge concern that dicamba off-target movement can result in significant losses in nearby sensitive crops. This concern is well-founded because many crops (such as soybean, cotton, snap bean, peanut, and watermelon) are highly sensitive to very low doses of dicamba. All precautions must be followed if the newer dicamba formulations are to be used in dicamba-tolerant crops. A few important considerations include right dicamba product selection, tank-mix products, avoiding use of ammonium sulfate, nozzle selection, buffer requirement, boom height, wind speed, and ground speed.

## Herbicide Selection

Dicamba has been available and widely used in corn, small grain, and pastures for over 50 years. There are many different brands of dicamba in the marketplace. *However, it is essential that only products approved for use in dicamba-tolerant crops be used.* The approved herbicides are XtendiMax from Monsanto, Engenia from BASF, FeXapan from DuPont, and Tavium from Syngenta. These specific herbicides must be used because they have been engineered to have very low volatility, or low potential to turn into a gas

after application, while maintaining full herbicidal potency, unlike the common Banvel-type or Clarity-type herbicides. Using a Banvel-type or Clarity-type herbicide over the top of dicamba-tolerant cotton or soybeans is illegal.

## Tank-Mix Products

Not all herbicide or pesticide products are compatible with newer dicamba formulations. Only certain products recommended in the XtendiMax, Engenia, FeXapan, Tavium label can be tank-mixed. The restriction for tank-mixing certain products is to protect the VaporGrip technology (low-volatility formulations) and to avoid dicamba volatility. Tank-mixing incompatible products can lead to significant dicamba volatility, off-target movement, and severe injury to the sensitive crops. Complete listings of the recommended tank-mix products for each dicamba herbicide can be found below.

- XtendiMax (<http://www.xtendimaxapplicationrequirements.com/Pages/tankmix.aspx#/>)
- Engenia (<https://agro.basf.us/campaigns/engenia/tankmixselector/>)
- FeXapan (<https://www.corteva.us/products-and-solutions/crop-protection/fexapan/tank-mix-partners.html>)

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The use of trade names in this publication is solely for the purpose of providing specific information. UF/IFAS does not guarantee or warranty the products named, and references to them in this publication do not signify our approval to the exclusion of other products of suitable composition. All chemicals should be used in accordance with directions on the manufacturer's label. Use herbicides safely. Read and follow directions on the manufacturer's label.

- Tavium (<http://www.syngenta-us.com/herbicides/tavium-tank-mixes>)

## Ammonium Sulfate

Ammonium sulfate should never be added with XtendiMax, Engenia, FeXapan, or Tavium. Adding ammonium sulfate, the principal component of many water conditioners sold at the retail level, creates unique chemical forces in the spray solution that convert low-volatility dicamba into a form with equal or greater volatility than Banvel. Adding any ammonium sulfate product negatively impacts VaporGrip Technology (low-volatility formulation) that has been engineered into the XtendiMax, Engenia, FeXapan, or Tavium formulations.

## Buffer Requirement

Buffer is required for XtendiMax, Engenia, FeXapan, or Tavium application. A 110-foot downwind buffer is required for dicamba application. In addition to the downwind buffer, add omnidirectional buffer of 57 feet in all sides in counties where endangered species are present. Omnidirectional buffer is required in three Florida counties: Jackson, Washington, and Calhoun. Additional information on omnidirectional buffer requirements is available at <https://www.regulations.gov/document?D=EPA-HQ-OPP-2016-0187-0974>. Even though buffer is in place, it is important not to spray when wind is blowing towards nearby sensitive crops or residential areas.

## Nozzle Selection

Nozzles create a range of droplet sizes from fine to coarse or ultra-coarse. The percentage of small droplets formed and those small droplets' ability to drift are issues that users of each nozzle must take into account. The EPA has reviewed many different nozzles over a wide range of operating pressures. This information indicates that only certain nozzles and pressure combinations are appropriate for application of herbicides such as XtendiMax, Engenia, FeXapan, and Tavium. For a current list of approved nozzles for XtendiMax, Engenia, FeXapan, or Tavium, see the links provided below. These lists will continue to be updated, so check these websites routinely for the most current information. *Note that use of any nozzle not specifically approved and listed on these websites would be considered a misuse.*

- XtendiMax (<http://www.xtendimaxapplicationrequirements.com/Pages/nozzles.aspx>)
- Engenia (<https://agro.basf.us/campaigns/engenia/tankmixselector/>)

- FeXapan (<https://www.corteva.us/products-and-solutions/crop-protection/fexapan/nozzles-and-spray-pressures.html>)
- Tavium (<http://www.syngenta-us.com/herbicides/tavium-tank-mixes#nozzles>)

Nozzles										
Last Updated on February 12, 2020										
Manufacturer	Nozzle Type	Part Number	Operating Pressure (psi)							
			20	30	40	50	60	70	80	90
Greenleaf Technologies	TADF03-D	TADF03-D	Min 20		Max 40					
	TADF06-D	TADF06-D	Min 20			Max 50				
	TDXL 11003-D	TDXL 11003-D	Min 20		Max 40					
	TDXL 11004-D	TDXL 11004-D	Min 20			Max 50				
	TDXL 11005-D	TDXL 11005-D	Min 20				Max 60			
	TDXL 11006-D	TDXL 11006-D	Min 20					Max 60		
Pentair Hypro	ULD120-04	ULD120-04 / FC-ULD120-04	Min 20		Max 40					
	ULD120-05	ULD120-05 / FC-ULD120-05	Min 20		Max 40					
	ULDM130-03	ULDM130-03		Min 30			Max 60			
	ULDM130-04	ULDM130-04		Min 30						Max 90
	ULDM130-05	ULDM130-05		Min 30				Max 70		
	ULDM130-06	ULDM130-06		Min 30			Max 60			
John Deere	ULD120-04	PSULD2004 / PSULDQ2004	Min 20		Max 40					
	ULD120-05	PSULD2005 / PSULDQ2005	Min 20		Max 40					
	PSULDMQ3003	PSULDMQ3003		Min 30			Max 60			
	PSULDMQ3004	PSULDMQ3004		Min 30						Max 90
	PSULDMQ3005	PSULDMQ3005		Min 30				Max 70		

Figure 1. List of nozzles and pressures that can be used to apply XtendiMax herbicide.

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## Boom Height

Controlling the spray boom height above the crop canopy is essential to reducing drift. With appropriate boom height, the droplet is less likely to travel longer distances, thus reducing potential for off-site movement. For this reason, a maximum boom height of 24 inches above the soil surface or the crop canopy is recommended in the dicamba herbicide products label. Exceeding this height dramatically increases drift potential.

## Wind Speed

It is essential to pay close attention to wind speeds before and during dicamba application. The newer dicamba product label recommends wind speed to be 3–10 mph for dicamba application. XtendiMax, Engenia, FeXapan, and Tavium are not exempt from the 10 mph maximum wind speed that has been in the Florida Organo-Auxin Herbicide Rule (Florida Department of Agriculture and Consumer Services 2010) for over 30 years. Records of wind speed and direction need to be kept closely. Spraying must cease if the wind speed is too high or if the wind blows toward a sensitive crop.

## Ground Speed

Spraying at appropriate speed is essential for reducing off-target movement. Higher ground speed may result in a vortex effect (where spray droplets circulate in a spiral pattern) behind the sprayer and contribute to off-target movement. The ground speed cannot exceed 15 mph while spraying, and 5 mph is recommended while spraying field edges. Spray volume is also an important factor; therefore, newer dicamba products are required to spray at a minimum of 15 GPA.

## Frequently Asked Questions

### Why are these restrictions important?

This is a conditional federal registration, which is quite uncommon. This means that the registration is time-limited and will expire in December 2020 if the EPA does not extend it. At that time, the EPA will assess how many drift complaints or fields with documented resistance have been filed and determine if these numbers are too high to justify the full registration of XtendiMax, Engenia, FeXapan, and Tavium in cotton and soybeans. Therefore, it is essential to continue rotating herbicide chemistry and using pre-emergence herbicides to reduce the likelihood of resistance development. It will also be essential to observe the buffer zone, nozzle selection, and wind speed requirements to ensure that drift does not occur.

### Can I continue to use conventional 2,4-D or dicamba formulations in non-dicamba crops?

Yes. However, you must follow the instructions on the label for that specific herbicide. For example, Banvel must be applied 21 days (plus rainfall) before cotton can be planted. XtendiMax, Engenia, FeXapan, and Tavium can be applied preplant or at planting, or over the top in dicamba-tolerant crops. Older formulations may provide an economic advantage, but the newer formulations will provide application flexibility (can be applied over the top on dicamba-tolerant crops). Regardless of which dicamba or 2,4-D product is used, the Florida Organo-Auxin Herbicide Rule (Florida Department of Agriculture and Consumer Services 2010) must be followed.

### Can I tank-mix dicamba (XtendiMax, Engenia, FeXapan, or Tavium) with glufosinate or glyphosate?

Currently, glyphosate is an allowed tank-mix partner, but glufosinate is not. There are several tank-mix partners

allowed with XtendiMax, Engenia, FeXapan, and Tavium. Refer to the links above for lists of current products.

### Are there special licensing requirements to purchase or apply these herbicides?

Yes, newer dicamba formulations are “Restricted Use Pesticides,” and only certified applicators with valid RUP Licenses are allowed to purchase and apply XtendiMax, Engenia, FeXapan, or Tavium herbicides. In addition, dicamba applicators are required to attend an annual Florida Dicamba Stewardship Training organized in collaboration by UF/IFAS, FDACS, and industry partners. Upon completion of this training, a certificate will be issued for proof of attendance, which must be made available upon the audit/request of the regulatory personnel/agency.

### Are there special tank clean-out procedures?

Use the following triple-rinse procedure: a) water; b) detergent-based cleaner, commercial tank cleaning solution, or 3% ammonia solution; and c) water. These make up the standard clean-out procedure after dicamba application. Do not let dicamba sit in the sprayer overnight. Doing this will make it much more difficult to effectively clean the tank.

### Is special recordkeeping required to comply with the FDACS Organo-Auxin Herbicide Rule?

Yes, recordkeeping is mandatory for XtendiMax, Engenia, FeXapan, or Tavium herbicide application. Applicators must generate records within 72 hours after applying these herbicides. This record must be kept available for at least two years. A separate record has to be maintained for each field or application.

## References

Florida Department of Agriculture and Consumer Services. 2010. “5E-2.033 Organo-Auxin Herbicides: Restrictions and Prohibitions.” *Florida Department of State Florida Administrative Code & Florida Administrative Register*. Accessed on February 20, 2017. <https://www.flrules.org/gateway/ruleno.asp?id=5E-2.033>

Monsanto. 2016. “Nozzles.” *XtendiMax™ Herbicide with VaporGrip™ Technology*. Accessed on February 21, 2017. <http://www.xtendimaxapplicationrequirements.com/Pages/default.aspx>